REMARKS

In the Office Action mailed February 25, 2004, claims 107, 109, 110, 112-116, and 122 were rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 5,150,372 to Nourrcier in view of U.S. Patent No. 3,939,435 to Suzuki. Claims 108, 111, and 117-121 were objected to as being directed toward allowable subject matter but depending from rejected base claims.

Applicants have rewritten claim 108 in independent form, incorporating all limitations of rejected claim 107. Claims 111 and 117-121 each ultimately depends from claim 108. As such Applicants believe claims 108, 111, and 117-121 to be in a form suitable for allowance and such is earnestly solicited.

Claim 107 was rejected as obvious over Nourrcier in view of Suzuki. The MPEP sets forth the following requirements for establishing a *prima facie* case of obviousness:

> ESTABLISHING A PRIMA FACIE CASE OF OBVIOUSNESS
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> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicants disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991). *See* MPEP § 2143 - § 2143.03 for decisions pertinent to each of these criteria.

MPEP § 2142. As is discussed in detail below, the Nourrcier and Suzuki references do not teach all the limitations of the rejected claims and thus do not establish a *prima facie* case of obviousness.

Claim 107 is directed toward a method for efficiently driving a laser diode. The first recited limitation of claim 107, namely "providing a wideband input signal", is not taught by either of the cited references. Notably, Suzuki does not disclose any

particularities about the type of input signal directed into the power amplifier. Most particularly, Suzuki does not disclose a wideband input signal.

Nourrcier likewise does not disclose this limitation. Nourrcier discloses an input signal for purposes of igniting and driving a CO_2 waveguide laser. Nourrcier teaches that the input signal starts at about 159 MHz and is swept down to 150 MHz over a time period Td. *See*, Col. 4, ll. 56-65; Fig. 3C. At the optimal operating frequency for the CO_2 waveguide laser, Nourrcier describes the input signal as being "at a first frequency". Col. 2, line 30. By describing the input signal in this manner, Nourrcier teaches that the input signal is sinusoidal in nature. At no time during ignition or operation of the CO_2 waveguide laser does Nourrcier disclose that the nature of the input signal is anything but sinusoidal. In fact, the input signal is "maintained at the first frequency for continuous operation." Col. 2, ll. 37-39. Moreover, an input signal that is sinusoidal is not inherently a "wideband input signal". Nourrcier thus does not disclose this limitation of claim 107.

Claim 107 also recites the limitation of "providing a power amplifier with a low output impedance suited to drive a laser diode". Again, neither of the cited references disclose this limitation. For its part, Nourrcier teaches that impedance matching is appropriate between the laser driver circuitry and the laser. Col. 1, ll. 35-39; Col. 3, ll. 60-63. Nourrcier, however, does not provide any details as to how such impedance matching is achieved. Furthermore, Nourrcier admittedly does not disclose any details about the amplifier used to drive the laser, stating that "Although not shown in detail, the laser 10 includes a high power amplifier which amplifies the signal DRIVE and applies it to the laser optical assembly with suitable impedance matching." Col. 3, ll. 60-63. Where Nourrcier provides no significant details regarding the selection and configuration of the power amplifier, it certainly does not disclose the output impedance of the power amplifier. Nourrcier thus does not teach or disclose this limitation of claim 107.

Suzuki also does not teach or disclose this limitation when the teachings of this reference are considered as a whole. A reference must "be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention." *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984). MPEP § 2141.02 (emphasis in original). Suzuki discloses a power amplifier circuit which includes "a plurality of voltage amplifying means and a like plurality of signal impedance converting means". Col. 2, ll. 32-35; Figs 1-5. The disclosed power amplifier circuit is selectively configurable into one of three configurations and amplifies an input signal using a two stage process. The first stage is the "voltage amplifier stage", and the second stage is the "impedance converting stage". Col. 3, ll. 4-20. Suzuki discloses that the second stage is necessary because the first stage preferably has a high output impedance. Col. 3, ll. 10-13. Both stages are also required to achieve the parallel connected power amplifier configuration shown in Fig. 3. Importantly, Suzuki as a whole teaches that both stages are *required* when employing the disclosed power amplifier because both stages of the amplifier circuit are critical to the power amplifier operating as intended. In other words, Suzuki *does not* teach use of the impedance converting stage without the presence of the voltage amplifier stage. Thus, Suzuki does not teach that the impedance converting stage, standing alone, is "suited to drive a laser diode". Therefore, neither Nourrcier nor Suzuki teach the limitation of "providing a power amplifier with a low output impedance suited to drive a laser diode".

Claim 107 also includes the limitation of "generating a wideband output current from the wideband input signal to modulate the laser diode". As discussed above, neither Nourrcier nor Suzuki teach or disclose a wideband input signal. Since nether teaches the wideband input signal, they also do not teach or disclose generating the wideband output current from the wideband input signal.

Claim 107 also includes the limitation of "operating the power amplifier as a voltage-controlled current driver". Neither Nourrcier nor Suzuki teach this limitation. Because Nourrcier admittedly does not show the amplifier circuitry in detail (see discussion above), it does not disclose the limitation of operating the power amplifier as a voltage-controlled current driver. Suzuki also does not disclose this limitation, as it merely teaches the configurations shown in Figs. 1-5, none of which show operating the power amplifiers as voltage-controlled current drivers.

For each of the foregoing reasons, the combination of Nourrcier in view of Suzuki does not establish a *prima facie* case of obviousness over claim 107.

Claim 109 was also rejected as obvious over Nourrcier in view of Suzuki. Claim 109 includes all the limitations of claim 107 and the additional limitation of "the communication input signal is characterized by a rate of at least 10 Mbits/second and the power amplifier provides output current of at least 100 mA to the laser diode". Neither Nourrcier nor Suzuki teach or disclose these limitations. As discussed above, Suzuki is silent as to the characterization of the input signal. Suzuki also does not teach any particular current output requirements of the disclosed power amplifier. Suzuki therefore does not teach the limitations of claim 109. Similarly, Nourrcier, as discussed above, teaches a sinusoidal input signal. This sinusoidal input signal *is not* a communication signal characterized by a minimum bit rate. Furthermore, Nourrcier also does not teach any particular current output requirements of the disclosed power amplifier. For these reasons, the combination of Nourrcier in view of Suzuki does not establish a *prima facie* case of obviousness over claim 109.

Claim 110 was also rejected as obvious over Nourrcier in view of Suzuki. Claim 110 depends from claim 107, and for the same reasons discussed above, the combination of Nourrcier in view of Suzuki does not establish a *prima facie* case of obviousness over claim 110.

Claim 112 was also rejected as obvious over Nourrcier in view of Suzuki. Claim 112 includes all the limitations of claims 107 and 109, in addition to the limitation of "providing adaptive control of the output power of the laser driver." As discussed above, Nourrcier does not teach or disclose the particulars of the power amplifier that drives the laser. Thus, Nourrcier does not disclose "adaptive control" of the power amplifier. Suzuki also does not disclose this limitation. Therefore, for this reason and for the reasons discussed above in relation to claims 107 and 109, the combination of Nourrcier in view of Suzuki does not establish a *prima facie* case of obviousness over claim 112.

Claim 113 was also rejected as obvious over Nourrcier in view of Suzuki. Claim 113 includes all the limitations of claim 107 and the additional limitation of "controlling the laser output power in multiple discrete steps." Neither Nourrcier nor Suzuki teach or disclose this limitation. Suzuki is silent as to the use to which the disclosed amplifier is employed. Suzuki therefore does not teach or disclose how to control the power output of the device being used with the power amplifier. Nourrcier also does not teach this limitation. As discussed above, Nourrcier teaches sweeping the input signal from 159 MHz to 150 MHz. This sweep is depicted in Figs. 2b and 2c as being continuous. A continuous sweep of the frequency does not teach or disclose control of the laser output power in multiple discrete steps. Furthermore, the circuitry sweeping the input signal does not provide power to the waveguide laser. Rather, power to the waveguide laser is provided by the power amplifier that is not shown in detail, and Nourrcier provides no express or implied teaching that the output power of the waveguide laser is being controlled in any manner. For these reasons, the combination of Nourrcier in view of Suzuki does not establish a *prima facie* case of obviousness over claim 113.

Claim 114 was also rejected as obvious over Nourrcier in view of Suzuki. Claim 114 includes all the limitations of claims 107 and 113, and for the same reasons

discussed above, the combination of Nourrcier in view of Suzuki does not establish a *prima facie* case of obviousness over claim 114.

Claim 115 was also rejected as obvious over Nourrcier in view of Suzuki. Claim 115 includes all the limitations of claims 107 and 113 and the additional limitation that the power amplifier output power is controlled with "a digital control input signal characterized by at least two bits." Neither Nourrcier nor Suzuki teach or disclose this limitation. Neither teaches any type of control signal for purposes of controlling the power output of the power amplifier. The sweeping input signal disclosed by Nourrcier is used to ignite and maintain the laser. Nourrcier does not teach that this input signal is employed to control the output power of the power amplifier, which again is not disclosed in any significant amount of detail. For this reason, the combination of Nourrcier in view of Suzuki does not establish a *prima facie* case of obviousness over claim 115.

Claim 116, as amended, depends from claim 115 and ultimately depends from claims 107 and 113. This amendment was made to correct a typographical error. Claim 116 was also rejected as obvious over Nourrcier in view of Suzuki. For all the reasons stated above in relation to the parent claims, the combination of Nourrcier in view of Suzuki does not establish a *prima facie* case of obviousness over claim 116.

Claim 122 was also rejected as obvious over Nourrcier in view of Suzuki. Claim 122 includes all the limitations of claim 107 and the additional limitation of "monitoring peak-to-peak amplitude of the laser modulation current." Neither Nourrcier nor Suzuki teach or disclose this limitation. As previously discussed, Suzuki does not disclose monitoring the output of the disclosed power amplifier. Nourrcier, on the other hand, teaches monitoring the DRIVE signal by comparing the phase of this signal's frequency with a reference signal REF. This comparison, however, is not the same as and does not teach monitoring the peak-to-peak amplitude of the laser modulation current. For

this additional reason, the combination of Nourrcier in view of Suzuki does not establish a *prima facie* case of obviousness over claim 122.

For the foregoing reasons, reconsideration of the rejections is requested.

Respectfully submitted,

FULBRIGHT & JAWORSKI L.L.P.

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By: _____
David M. Morse
Reg. No. 50,505

Fulbright & Jaworski L.L.P.
865 South Figueroa Street
Twenty-Ninth Floor
Los Angeles, California 90017-2576
(213) 892-9200